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# 1 [Architecture for resource allocation services supporting interactive remote desktop sessions in utility grids](#)


[sessions in utility grids](#)

Vanish Talwar, Bikash Agarwalla, Sujoy Basu, Raj Kumar, Klara Nahrstedt

October 2004 **Proceedings of the 2nd workshop on Middleware for grid computing**

Publisher: ACM Press

Full text available: pdf(131.96 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Emerging large scale utility computing systems like Grids promise computing and storage to be provided to end users as a utility. System management services deployed in the middleware are a key to enabling this vision. Utility Grids provide a challenge in terms of scale, dynamism, and heterogeneity of resources and workloads. In this paper, we present a model based architecture for resource allocation services for Utility Grids. The proposed service is built in the context of interactive remo ...

**Keywords:** QoS, grid computing, remote desktop sessions, resource allocation service

# 2 [A SMART scheduler for multimedia applications](#)



Jason Nieh, Monica S. Lam

May 2003 **ACM Transactions on Computer Systems (TOCS)**, Volume 21 Issue 2

Publisher: ACM Press

Full text available: pdf(570.87 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Real-time applications such as multimedia audio and video are increasingly populating the workstation desktop. To support the execution of these applications in conjunction with traditional non-real-time applications, we have created SMART, a Scheduler for Multimedia And Real-Time applications. SMART supports applications with time constraints, and provides dynamic feedback to applications to allow them to adapt to the current load. In addition, the support for real-time applications is integrat ...

**Keywords:** Scheduling, multimedia, proportional sharing, real-time

# 3 [The design, implementation and evaluation of SMART: a scheduler for multimedia applications](#)




Jason Nieh, Monica S. Lam

October 1997 **ACM SIGOPS Operating Systems Review , Proceedings of the sixteenth ACM symposium on Operating systems principles SOSP '97**, Volume 31 Issue 5

Publisher: ACM Press

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#### 4 [Link-sharing and resource management models for packet networks](#)

Sally Floyd, Van Jacobson

August 1995 **IEEE/ACM Transactions on Networking (TON)**, Volume 3 Issue 4**Publisher:** IEEE PressFull text available:  [pdf\(2.51 MB\)](#) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

#### 5 [Session 8: systems support for multimedia: Cooperative run-time management of adaptive applications and distributed resources](#)

Christian Poellabauer, Hasan Abbasi, Karsten Schwan

December 2002 **Proceedings of the tenth ACM international conference on Multimedia****Publisher:** ACM PressFull text available:  [pdf\(434.38 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#)

This paper presents *Q-fabric*, which is a set of lightweight, kernel-level abstractions for cooperative, distributed resource management and system/application adaptation. The basis of *Q-fabric* is its kernel-level, anonymous, asynchronous event service. With this mechanism, (1) applications can monitor and manage the local and remote resources they are using, (2) system-level resource managers can customize their actions to meet the needs of individual applications, and (3) policies can be ...

**Keywords:** OS services, QoS management, adaptation, event service

#### 6 [Driving resource management with application-level quality of service specifications](#)

Michael J. Katchabaw, Hanan L. Lutfiyya, Michael A. Bauer

October 1998 **Proceedings of the first international conference on Information and computation economies****Publisher:** ACM PressFull text available:  [pdf\(1.12 MB\)](#) Additional Information: [full citation](#), [references](#), [index terms](#)**Keywords:** application-level quality of service, dynamic resource management, quality of service specification

#### 7 [Prioritized resource allocation for stressed networks](#)

Cory C. Beard, Victor S. Frost

October 2001 **IEEE/ACM Transactions on Networking (TON)**, Volume 9 Issue 5**Publisher:** IEEE PressFull text available:  [pdf\(253.05 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)


Overloads that occur during times of network stress result in blocked access to all users, independent of importance. These overloads can occur because of degraded resource availability or abnormally high demand. Public broadband networks must dynamically recognize some multimedia connections as having greater importance than others and allocate resources accordingly. A new approach to connection admission control is proposed that uses an upper limit policy to optimize the admission of connectio ...

**Keywords:** Computer network performance, resource management

#### 8 [Implicit coscheduling: coordinated scheduling with implicit information in distributed systems](#)

 Andrea Carol Arpaci-Dusseau  
August 2001 **ACM Transactions on Computer Systems (TOCS)**, Volume 19 Issue 3

**Publisher:** ACM Press

Full text available:  [pdf\(1.83 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

In modern distributed systems, coordinated time-sharing is required for communicating processes to leverage the performance of switch-based networks and low-overhead protocols. Coordinated time-sharing has traditionally been achieved with gang scheduling or explicit coscheduling, implementations of which often suffer from many deficiencies: multiple points of failure, high context-switch overheads, and poor interaction with client-server, interactive, and I/O-intensive workloads. I ...


**Keywords:** clusters, coscheduling, gang scheduling, networks of workstations, proportional-share scheduling, two-phase waiting

## 9 Efficient fault-tolerant algorithms for distributed resource allocation



 Manhoi Choy, Ambuj K. Singh  
May 1995 **ACM Transactions on Programming Languages and Systems (TOPLAS)**,  
Volume 17 Issue 3

**Publisher:** ACM Press


Full text available:  [pdf\(1.85 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

Solutions to resource allocation problems and other related synchronization problems in distributed systems are examined with respect to the measures of response time, message complexity, and failure locality. Response time measures the time it takes for an algorithm to respond to the requests of a process; message complexity measures the number of messages sent and received by a process; and failure locality characterizes the size of the network that is af ...


**Keywords:** committee coordination, dining philosophers, distributed resource allocation, failure locality

## 10 Improving interactive performance using TIPME



 Yasuhiro Endo, Margo Seltzer  
June 2000 **ACM SIGMETRICS Performance Evaluation Review , Proceedings of the 2000 ACM SIGMETRICS international conference on Measurement and modeling of computer systems SIGMETRICS '00**, Volume 28 Issue 1

**Publisher:** ACM Press

Full text available:  [pdf\(1.05 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

On the vast majority of today's computers, the dominant form of computation is GUI-based user interaction. In such an environment, the user's perception is the final arbiter of performance. Human-factors research shows that a user's perception of performance is affected by unexpectedly long delays. However, most performance-tuning techniques currently rely on throughput-sensitive benchmarks. While these techniques improve the average performance of the system, they do littl ...

**Keywords:** interactive performance, monitoring

## 11 Service applications: An OGSA-based accounting system for allocation enforcement across HPC centers



 Thomas Sandholm, Peter Gardfjäll, Erik Elmroth, Lennart Johnsson, Olle Mulmo  
November 2004 **Proceedings of the 2nd international conference on Service oriented computing**


**Publisher:** ACM Press

Full text available:  [pdf\(519.13 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

In this paper, we present an Open Grid Services Architecture (OGSA)-based decentralized allocation enforcement system, developed with an emphasis on a consistent data model and easy integration into existing scheduling, and workload management software at six independent high-performance computing centers forming a Grid known as SweGrid. The Swedish National Allocations Committee (SNAC) allocates resource quotas at these centers to research projects requiring substantial computer time. Our sy ...


**Keywords:** HPC, OGSA, grid accounting, grid computing, security policy management, web services

## 12 [Feedback coupled resource allocation policies in the multiprogramming-multiprocessor computer system](#)

 Richard S. Brice, J. C. Browne

August 1978 **Communications of the ACM**, Volume 21 Issue 8

**Publisher:** ACM Press

Full text available:  [pdf\(959.14 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Model studies of some integrated, feedback-driven scheduling systems for multiprogrammed-multiprocessor computer systems are presented. The basic control variables used are the data-flow rates for the processes executing on the CPU. The model systems feature simulated continuous-flow and preempt-resume scheduling of input-output activity. Attention is given to the amount of memory resource required for effective processing of the I/O activity (buffer space assignment). The model studies use ...

**Keywords:** I/O system scheduling, feedback scheduling, integrated schedulers, multiprogramming systems

## 13 [Applying conflict management strategies in BDI agents for resource management in computational grids](#)

Omer F. Rana, Michael Winikoff, Lin Padgham, James Harland

January 2002 **Australian Computer Science Communications , Proceedings of the twenty-fifth Australasian conference on Computer science - Volume 4 CRPITS '02**, Volume 24 Issue 1

**Publisher:** Australian Computer Society, Inc. , IEEE Computer Society Press

Full text available:  [pdf\(1.13 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)


Managing resources in large scale distributed systems --- "Computational Grids", is a complex and time sensitive process. The computational resources being shared vary in type and complexity, and resource properties can change over time. An approach based on interacting software agents is presented, where each resource manager and resource requester is modelled as a BDI (Belief-Desire-Intention) agent. The proposed approach can help resolve conflicts that arise during resource discovery and appl ...

## 14 [Active middleware services in a decision support system for managing highly available distributed resources](#)

Sameh A. Fakhouri, William F. Jerome, Vijay K. Naik, Ajay Raina, Pradeep Varma


April 2000 **IFIP/ACM International Conference on Distributed systems platforms**

**Publisher:** Springer-Verlag New York, Inc.


Full text available:  [pdf\(306.87 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#)

We describe a decision support system called Mounties that is designed for managing applications and resources using rule-based constraints in scalable mission-critical clustering environments. Mounties consists of four active service components: (1) a repository of resource proxy objects for modeling and manipulating the cluster configuration; (2) an event notification mechanism for monitoring and controlling interdependent and distributed resources; (3) a rule evaluation and decision proces ...

# 15 Managing energy and server resources in hosting centers

 Jeffrey S. Chase, Darrell C. Anderson, Prachi N. Thakar, Amin M. Vahdat, Ronald P. Doyle  
October 2001 **ACM SIGOPS Operating Systems Review**, **Proceedings of the eighteenth ACM symposium on Operating systems principles SOSP '01**, Volume 35 Issue 5

**Publisher:** ACM Press

Full text available:  [pdf\(1.61 MB\)](#)


Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Internet hosting centers serve multiple service sites from a common hardware base. This paper presents the design and implementation of an architecture for resource management in a hosting center operating system, with an emphasis on *energy* as a driving resource management issue for large server clusters. The goals are to provision server resources for co-hosted services in a way that automatically adapts to offered load, improve the energy efficiency of server clusters by dynamically res ...

# 16 Web services: composition, integration and interoperability: Adaptive resource sharing in a web services environment

Vijay K. Naik, Swaminathan Sivasubramanian, Sriram Krishnan  
October 2004 **Proceedings of the 5th ACM/IFIP/USENIX international conference on Middleware**


**Publisher:** Springer-Verlag New York, Inc.

Full text available:  [pdf\(266.25 KB\)](#)


Additional Information: [full citation](#), [abstract](#), [references](#)

One effect of the push towards business process automation and IT consolidation is that low-level resources from multiple administrative domains are shared among multiple workloads and the middleware is called upon to bring about the integration while masking the details of sharing such resources. Web services and grid based technologies hold promise for developing such middleware. However, existing solutions do not extend well when resources to be shared belong to multiple administrative domain ...

# 17 Experience Using Multiprocessor Systems—A Status Report


 Anita K. Jones, Peter Schwarz  
June 1980 **ACM Computing Surveys (CSUR)**, Volume 12 Issue 2

**Publisher:** ACM Press


Full text available:  [pdf\(4.48 MB\)](#)

Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

# 18 The UMASS intelligent home project


 Victor Lesser, Michael Atighetchi, Brett Benyo, Bryan Horling, Anita Raja, Régis Vincent, Thomas Wagner, Ping Xuan, Shelley XQ. Zhang  
April 1999 **Proceedings of the third annual conference on Autonomous Agents**

**Publisher:** ACM Press


Full text available:  [pdf\(1.23 MB\)](#)

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# 19 An expert systems based methodology for solving resource allocation problems

 Ehud Gudes, Tsvi Kuflik, Amnon Meisels  
June 1990 **Proceedings of the 3rd international conference on Industrial and engineering applications of artificial intelligence and expert systems - Volume 1 IEA/AIE '90**

**Publisher:** ACM Press

Full text available:  [pdf\(762.09 KB\)](#)

Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

A general paradigm for solving resource allocation, time-tabling and scheduling problems is presented. The paradigm is based on an expert system approach which looks for a feasible solution that satisfies the problem's real-life constraints, rather than on an analytic approach which looks for an optimal solution by using simplified constraints. The

main feature of the new paradigm is a general control strategy which includes three parts that deal with allocation, with constraints checking a ...


## 20 Application performance in the QLinux multimedia operating system



Vijay Sundaram, Abhishek Chandra, Pawan Goyal, Prashant Shenoy, Jasleen Sahni, Harrick Vin

October 2000 **Proceedings of the eighth ACM international conference on Multimedia**

**Publisher:** ACM Press

Full text available:  pdf(918.51 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

*In this paper, we argue that conventional operating systems need to be enhanced with predictable resource management mechanisms to meet the diverse performance requirements of emerging multimedia and web applications. We present QLinux—a multimedia operating system based on the Linux kernel that meets this requirement. QLinux employs hierarchical schedulers for fair, predictable allocation of processor, disk and network bandwidth, and accounting mechanisms for appropriate charging of ...*

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